



## Operating and Emergency Procedures for the PHENIX

### PC-3 Prototype in Building 820

#### PHENIX Procedure No. PP-2.5.2.5-02

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#### Hand Processed Changes

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#### Approvals

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PHENIX S E & I	Cognizant Scientist/Engineer	Date
Date	/Activity Manager	

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PHENIX QA/Safety	RHIC ES&H	Date
Date		

**Operating and Emergency Procedures for the PHENIX**

**REVISION CONTROL SHEET**

<b>LETTER</b>	<b>DESCRIPTION</b>	<b>DATE</b>	<b>WRITTEN BY</b>	<b>APPROVED BY</b>	<b>TYPED BY</b>
A	First Issue	2/1/1999	n/a	None recorded	n/a
RETIRED	Prototype test completed. Procedure no longer needed	2/14/2007	(Retirement note written by. D.Lynch)	Retirement approved by D. Lynch, R. Pisani and P. Giannotti for the PHENIX experiment	n/a

# PC-3 Prototype In Building 820

## 1. Purpose

1. Define the local emergency plan for operation of the PC-3 prototype system at its location in Building 820. This local emergency plan will ensure:
  - A. the safety of all personnel from risks associated with the operation of the gas and high voltage systems required for the Pad Chamber (PC) prototype,
  - B. the implementation of the appropriate emergency procedures,
  - C. prompt notification of the appropriate RHIC and S&H Services Division specialists,
  - D. the maintenance of appropriate RHIC emergency status,
  - E. the preservation and protection of the environment, and
  - F. the preservation of BNL facilities and equipment.
1. In addition to the emergency plan, this document covers the standard operating procedures for using compressed gas in the PC fabrication building

## 1. Responsibilities

During the testing of the PHENIX PC-3 system in its location in Bldg. 820, a Local Emergency Coordinator (LEC) shall be identified for each work shift. The list of designated LECs as given in Appendix 1 shall be posted near the gas system. The LEC is responsible for:

- A. maintaining the PC-3 system (see Attachment 2) in a safe operating condition. This includes
  - i. changing gas bottles.
  - ii. checking the certification of the 50-50 argon/ethane gas.
- A. assuring that all personnel involved in the PC-3 system operations are trained in the procedures required for the safe operation of this system,
- B. posting any special instructions or notifications as required, and
- C. carrying out any emergency actions, as prescribed in Section 5.0 of this document.

## 1. Prerequisites

The LEC shall have training in the following areas:

- A. RHIC Project Local Emergency Plan, RHIC-OPM 3.0,
- B. Compressed Gas Safety Training Course,
- C. all equipment involved in the PC-3 systems being used, and
- D. geographical layout of the experimental area (routes of egress, location of emergency equipment, phones and controls, etc.)

The LEC shall train all personnel involved in the prototype tests in the safe operation of the compressed gas

system. Before any member of the group is allowed to operate the gas system, they must be approved by the LEC and be listed as a trained operator.

## **1. Precautions**

The safety of personnel is of primary importance. The LEC shall take great care to ensure that the PC-3 system will be operated in a way that does not place personnel at risk of physical harm.

## **2. Emergency Procedures**

### *1. In the event of a fire or fire alarm in Building 820 (in order of priority)*

1. Pull the nearest fire alarm box if the alarm is not already sounding (Attachment 1 gives the layout of the PC-3 system area),
2. Close the valve on top of the gas bottles supplying 50-50 argon/ethane to the PC-3 system.
3. Turn off the power to all high voltage (HV) and low voltage (LV) supplies connected to the PC-3 system,
4. Go to a safe location and call 911 or 2222.
5. If the fire is small, the LEC may return to the area and attempt to extinguish the fire using a fire extinguisher.
6. The LEC shall report to the Fire/Rescue Captain upon arrival at the Command Post (Car-1 the white Suburban).

### *2. In the event that a gas line ruptures:*

1. Close the valve on the top of the gas bottle supplying 50-50 argon/ethane to the PC-3 system.
2. Turn off the power to all high voltage (HV) and low voltage (LV) supplies connected to the PC-3 system,
3. Contact a gas system expert (names and contact information are posted next to the gas supply rack, and in Appendix 2).

## **3. Standard Operating Procedures**

### *1. In order to purge a chamber:*

1. Make sure the valve at the exit of the pressure regulator on the nitrogen bottle is closed.
2. Make sure the valve on the nitrogen flow meter and all other flow meters are closed (Don't rely on the flow meter valves for extended shut-off of gas bottle.)
3. Open the valve on top of the gas bottle. Record the pressure remaining in the bottle.

4. Check that the operating pressure on the regulator is set to 5 psig. If it is not at 5 psig, then set it to 5 psig. (Pressure at the outlet of the regulator can be reduced by turning the valve counter-clock-wise, and increased by turning clock-wise.)
5. Slowly open the nitrogen flow meter valve. Set the flow rate to 0.2 standard cubic foot per hour (SCFH). *Note: A full bottle of nitrogen is ~2000 psi. This represents about 210 cubic feet of nitrogen, or about 1050 hours of running at 0.2 SCFH. Use this to estimate when the nitrogen bottle will need to be changed and plan to change it before it runs out.*
6. Look at the appropriate bubbler to make sure that there is gas flow leaving the chamber. It may take several minutes before sufficient pressure builds up in the chamber to push gas through the bubbler.
7. Allow the chamber to flow nitrogen until there has been at least three exchanges of gas inside the chamber. (This represents about 38 hours for PC-3.)
8. Close the valve on top of the gas bottle. Record the pressure remaining in the bottle.
9. Close the valve at the exit of the regulator.
10. Close the valve on the nitrogen flow meter.

2. *In order to flow 50-50 argon/ethane through a chamber:*

1. Make sure the valve at the exit of the pressure regulator on the 50-50 argon/ethane bottle is closed.
2. Make sure the valve on the 50-50 argon/ethane flow meter and all other flow meters are closed. (Don't rely on the flow meter valves for extended shut-off of gas bottle.)
3. Open the valve on top of the gas bottle. Record the pressure remaining in the bottle.
4. Check that the operating pressure on the regulator is set to 5 psig. If it is not at 5 psig, then set it to 5 psig. (Pressure at the outlet of the regulator can be reduced by turning the valve counterclock-wise, and increased by turning clock-wise.)
5. Slowly open the 50-50 argon/ethane flow meter valve. Set the flow rate to 0.2 SCFH for PC-3.
6. Look at the appropriate bubbler to make sure that there is gas flow leaving the chamber. It may take several minutes before sufficient pressure builds up in the chamber to push gas through the bubbler.
7. Allow the chamber to flow 50-50 argon/ethane until there has been at least three exchanges of gas inside the chamber. (This represents about 38 hours for the PC3.)
8. It is now safe to turn on the high voltage on the chamber.

3. *In order to shut off gas flow to a chamber:*

1. Close the valve on top of the gas bottle. Record the pressure remaining in the bottle.

2. Close the valve at the exit of the regulator.
3. Close the valve on the flow meter
4. *Startup Procedure:*
  1. Purge chamber with Nitrogen by executing sequence 6.1
  2. Fill chamber with 50-50 argon/ethane by executing sequence 6.2
5. *Shutdown Procedure:*
  1. Shut off Argon/Ethane gas flow to the chamber by executing sequence 6.3
  2. Purge chamber with Nitrogen by executing sequence 6.1
  3. Shut off gas flow by executing sequence 6.3

#### **4. Documentation**

1. None.

#### **5. References**

1. RHIC-OPM 3.0, "Local Emergency Plan for the Relativistic Heavy Ion Collider Project".
2. BNL ES&H Health Standard, Section 1.4.0, "Compressed Gas Cylinder Safety", December 18, 1991.
3. BNL Occupational Health and Safety Guide (Interim), Section 4.11.0, "Installation of Flammable Gas Systems (Experimental & Temporary Installations)", June 21, 1989.

#### **6. Appendix 1**

1. Call list of designated LEC.
  1. Michael Sivertz x6102
  2. Victoria Greene x6102
  3. Bill Licciardi x6395

#### **7. Appendix 2**

1. Call list for the PC-3 system gas experts.
  1. Michael Sivertz x6102
  2. Victoria Greene x6102
  3. Bill Licciardi x6395

## **8. Appendix 3**

1. Attachment 1 – [Layout of the 820 building showing:](#)
  1. PC-3 system location,
  2. Gas bottle location,
  3. Fire alarms,
  4. Telephones
2. Attachment 2 – [Schematic of the PC3 Gas system.](#)